

**WHAT IS CLAIMED IS:**

- Sub 17
1. A method for decoding transmitted data that has been generated by encoding a sequence of information data with a convolutional encoder
- 5 that generates convolutional codes based on an input sequence of information data, the encoder characterized by a constraint length  $K$  and a rate  $k/n$ , the method employing a decoder with a memory, the method comprising the steps of:
- (a) storing a first encoder state corresponding to a first time step;
- 10 (b) beginning at the first time step, performing a first traceback through a plurality time steps, thereby determining a first input bit corresponding to an encoder state transition from the last time step of the first traceback to the second to last time step of the first traceback;
- (c) storing in the decoder memory a first possible input bit corresponding to
- 15 a transition from an encoder state at a third time step within the first traceback, to an encoder state at a fourth time step within the first traceback, where neither the third nor fourth time steps are the last time step;

- (d) performing a second traceback beginning at a second time step and encompassing the first time step, thereby determining a second encoder state at the first time step;
- (e) comparing the first encoder state with the second encoder state;
- 5 (f) if the first encoder state is equal to the second encoder state, designating the first possible input data bit as a decoded data bit corresponding to a transition from the encoder state at the third time step to the encoder state at the fourth time step.
2. The method of claim 1 wherein the second time step is the next time step
- 10 after the first time step.
3. The method of claim 1 wherein the third time step is the next time step after the last time step.
4. The method of claim 1 wherein the second traceback ends at the first time step.
- 15 5. The method of claim 1 wherein the second traceback traces back through one time step.
6. The method of claim 1 further comprising the steps of storing in the decoder memory, for each transition within the first traceback, a possible

input bit corresponding to the transition, thereby storing a plurality of possible input data bits in addition to the first possible input bit.

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